Developing Cloud-based Sportswear Website

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Abstract

This research is going to develop a cloud-based sportswear website that can handle high volumes of traffic during events or seasonal sales, assist customers in selecting the right size for their sportswear, the interface should have options, size charts, fitting instructions, and recommendations. A study on the existing system will be conducted, design, develop and evaluate on the sportswear website also will be carried out. The system development approach used on this website is Rapid Application Development (RAD) model. The reason to choose RAD is because this method is time efficient, flexibility and adaptability. With RAD, functional software is delivered quickly. We can quickly build prototypes, iterate on them, and gather feedback from stakeholders with a website project. There are four of the steps in Rapid Application Development (RAD) methodology life cycle, which is define the requirements, prototypes, rapid construction and feedback gathering, and cutover.

Keywords: Cloud computing, Sportswear trend, E-commerce

1. Introduction

The Internet, especially with the advent of cloud computing, has brought about significant changes in our world. Cloud computing, a highly advanced technological product, has emerged as a key player in the 21st century's era of globalization, promoting social normalization and expanding social equality [1]. This innovation relies on the World Wide Web and the rapid growth of Internet technology, offering a solid and scalable security structure crucial for its real-world applications.

Distinguishing e-commerce from traditional commerce, e-commerce conducts transactions online, allowing users to shop, trade, auction, and access various services. The advantages of e-commerce include lower costs, increased convenience, and access to a broader range of products. Cloud computing, viewed as the next revolution in the science and technology industry, is expected to significantly impact enterprise operations when combined with e-commerce. It eliminates the complexities and costs associated with traditional business applications, providing shared infrastructure and scalability.

Cloud computing provides computer resources as a service over the internet, offering dynamic scalability and virtualization. Users' information is stored remotely, allowing accessibility anytime, anywhere. The three basic cloud computing service models are Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), each serving distinct purposes in the cloud ecosystem [6].

The e-commerce landscape is evolving, and cloud computing is playing a pivotal role in shaping its technical architecture. Different types of e-commerce, such as B2B, B2C, C2C, C2B, B2A, and C2A, cater to diverse business models and transactions. This project specifically adopts the B2C model, focusing on selling athletic apparel and related items directly to individual users through a sportswear website [2].

Amazon EC2 (Elastic Compute Cloud) exemplifies how cloud computing can benefit e-commerce enterprises. Instead of purchasing hardware and software, businesses can rent them, reducing system building costs. EC2, a popular cloud system, allows users to rent cloud-based applications, providing flexibility and cost-effectiveness. In this project, EC2 is

chosen as the cloud server to store website data, leveraging the benefits of Amazon Web Services (AWS).

The impact of social media on customer buying behavior is noteworthy, with 3.6 billion users across various platforms. Social media platforms enhance customer connection, broaden reach, and provide businesses with opportunities to interact with and influence customer behavior. Building brand equity through social media is recognized as a valuable asset in the contemporary market [3].

Sportswear has become a fashion trend, influenced by changes in lifestyle, the demand for functional performance clothing, and the growing interest in fitness outerwear [7]. Activewear manufacturers thrive as fitness-conscious consumers seek appropriate gear. The activewear market, particularly in the United States, is robust, with Nike and Adidas leading in revenue. Women's sportswear sales surpass those of men's and children's, and this trend is expected to continue into the 2020s [4], [5], [8].

2. Methodology

The Rapid Application Development (RAD) approach revolutionizes software application development with its iterative and user-centric methodology. Primarily designed for projects requiring ongoing user participation, RAD's strength lies in its adaptability and responsiveness to changing requirements. Contrary to the traditional waterfall development paradigm, RAD, introduced in 1991, thrives on flexibility and efficiency, making it particularly effective for managing modest and medium-sized projects.

The RAD process unfolds through distinct phases. During the Planning and Define Requirements phase, meticulous research and requirement gatherings take place to grasp the project's objectives, audience, scope, and establish measurable goals. A questionnaire sent to website clients ensures a comprehensive understanding of their needs. Prototyping follows, where the project team collaboratively creates an early working model of the website, incorporating user feedback through iterative cycles and casual interviews to refine features and eliminate design errors.

Rapid Construction and Feedback Gathering phase translates user feedback into practical development tasks, including coding and testing. Adjustments are made to application prototypes based on recommendations, and thorough testing ensures effective functionality. Once the website is launched, the Maintenance phase kicks in, focusing on regular upkeep to keep the site current, secure, and operational. This involves content updates, software and plugin maintenance, issue resolution, and adapting to evolving user input or business requirements.

3. Results and Discussion

The questionnaire results reveal key insights into consumer behavior and preferences for online sportswear shopping. Regardless of age, respondents engaged in sports are more inclined to shop for sportswear online, with those in their 20s and 30s showing the highest likelihood. Older age groups, especially those between 51 to 60 years old, show a reluctance to adopt e-commerce, possibly due to limited familiarity with technology.

Device usage for online shopping is evenly split between desktop and mobile, with respondents less likely to use tablets. JD Sports emerges as more popular than Nike and Adidas, attributed to its diverse range of brands and products. User-friendly navigation menus and simple, clean website designs are highly valued by respondents.

Product preferences highlight running shoes and activewear as top choices, driven not only by sports engagement but also as fashion items. Eco-friendly and sustainable sportswear gains significant preference, reflecting a growing awareness of environmental impact among consumers.

In terms of information, sizing guides, material details, and product reviews are considered crucial. The website's content, including blog articles, styling tips, and athlete endorsements, is appreciated by half of the respondents.

Checkout preferences are divided, with half opting for guest checkout and the other half preferring account creation before purchase. Touch ′ n Go is the favored payment method, emphasizing the importance of seamless transactions and a secure checkout process.

Email is the preferred mode of communication for customer support, chosen by half of the respondents over phone and live chat. Privacy and data security are paramount, with customers expecting companies to safeguard their information.

Overall, respondents express satisfaction with their online shopping experiences, emphasizing the importance of trust, reasonable pricing, and quality products for a successful e-commerce venture.

3.1 Implementation

This section focuses on a dynamic use case as shown in Fig. 1, emphasizing the synthesis of various diagrams to provide a comprehensive understanding of a specific system. Starting with a clever use case scenario analysis, An Entity-Relationship (ER) diagram (Fig. 2) visualizes the database structure. Concrete observations, such as screenshots of the admin and customer website sections, are integrated to bridge conceptual and practical aspects,

offering a holistic overview of the system's design and operation (Fig. 3).

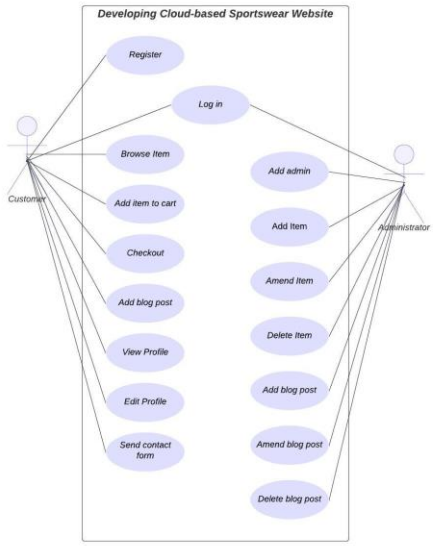

Fig. 1 Use Case Diagram

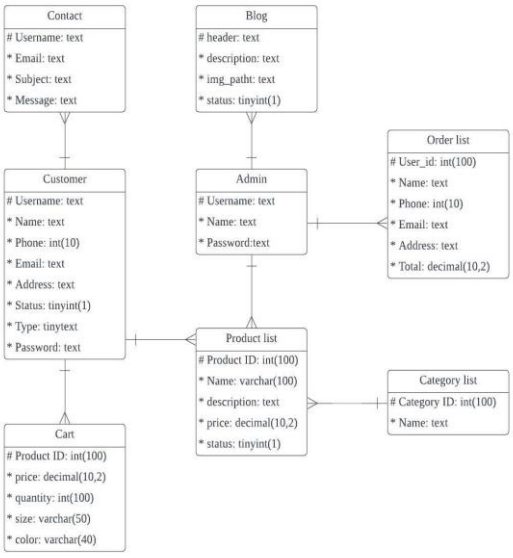

Fig. 2 Entity Relationship Diagram

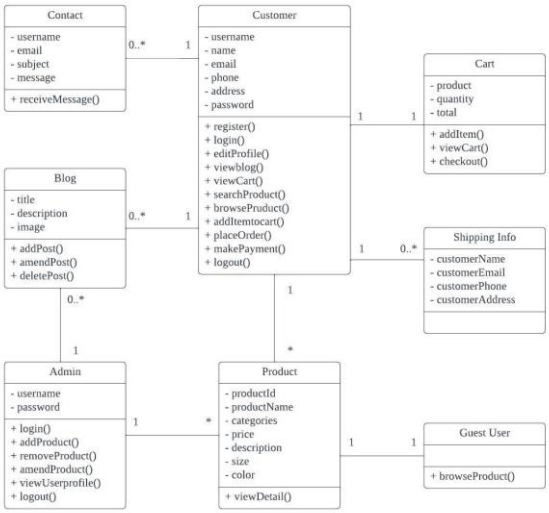

Fig. 3 Class Diagram

3.2 Evaluation

Evaluation begins with three crucial testing stages: unit testing, integration testing, and system testing. Together, these stages allow us to thoroughly assess the functionality and dependability of the proposed website.

Table 1, Table 2, Table 3 and Table 4 show the summary of the testing for each of the stages.

Table 1. Login Unit Test

Procedure Description	Expected Result	Actual Result	Test Result
Username text field	Allow user to key in their username.	Working as expected	Pass
Password text field	Allow user to key in their password.	Working as expected	Pass
Login button (Admin)	Allow admin to authenticate to access the website.	Working as expected	Pass
Login button (Customer)	Allow customer to authenticate to access the website.	Working as expected	Pass
Forget Password button	Allow user to reset their password.	Working as expected	Pass

Table 2. Integration Test

Procedure Description	Expected Result	Actual Result	Test Result
Login function should connect to database to validate the user.	The system able to connect to database and authenticate the user based on their username and password.	The system connects to database and verifies the user.	Pass
Customer place order function should connect to database to record customer order.	The system able to store customer order in the database.	The system connects to database and store customer order.	Pass
Admin side function should connect to database to update product detail.	The system able to store product detail in the database.	The system connects to database and store product detail.	Pass

Table 3. Admin side System Testing

Expected Result	Actual Result
Admin able to login to the system.	Admin can login successfully by insert username and password.
Admin able to view product on website.	All product is showed on the website.
Admin can add new product.	Product can be added by insert all the product detail.
Admin can amend product detail.	Product can be amended by insert all the amend detail.
Admin can delete product.	Product can be deleted by clicking the confirm delete button.
Admin can search user list.	User list is showed when search button is clicked.
Admin can add new admin.	New admin can be added by insert all the admin detail.
Admin can inactivate or activate user.	User can inactivate or activate when button is clicked.
Admin can logout from then system.	Admin can logout successfully when logout button is clicked.

Table 4. User Perception Test

Function	Yes/No
All the button are working perfectly	Yes
Able to login	Yes
All text field allow user to enter text	Yes
Dropdown menu allow user selection	Yes
Navigation menu allow user selection	Yes
All website functions are operational and working seamlessly	Yes
Error message when username or password incorrect	Yes
Alert successful message when action is performed	Yes
Able to logout	Yes

4. Conclusion

In summary, the construction and hosting of a cloud-based sportswear website on Amazon EC2 involved careful consideration of critical factors, particularly in response to the evolving landscape of e-commerce accelerated by the COVID-19 pandemic. The adoption of Amazon EC2, a reliable and scalable cloud computing solution, underscored the importance of leveraging technology for resilience and competitiveness in the e-commerce industry. The Rapid Application Development (RAD) methodology facilitated a collaborative and iterative development approach, aligning with the dynamic nature of e-commerce. Rigorous testing, including unit tests, integration tests, system tests, and user perception tests, ensured the website's reliability, functionality, and user satisfaction. This effective combination of digital technologies, cloud computing, RAD methodology, and comprehensive testing positions the sportswear website for success in the competitive e-commerce landscape, addressing challenges posed by the pandemic and establishing a robust foundation for sustained success in the dynamic online business environment.

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